Ontario

2002 Annual Report

Lake Erie Management Unit

The Lake Erie Management Unit of the Ontario Ministry of Natural Resources is responsible for managing the fishery resources of the Ontario waters of Lake Erie, as well as the upper Niagara River, the Detroit River, Lake St. Clair, and the St. Clair River.

Ontario has been responsible for managing the fishery resources of these waters since 1898. In 1992, the Lake Erie Management Unit was created to improve Ontario's ability to manage these important resources. The Unit is based in London with field offices in Port Dover and Wheatley.

VISION: The Lake Erie Management Unit will contribute to the environmental, social, and economic well-being of the people of Ontario through the sustainable development of fishery resources within the Lake Erie basin.

MISSION: To ensure the long-term health of the Lake Erie ecosystem and to promote the sustainable harvest and development of its fishery resource through sound science, assessment, regulation, and advocacy.

GOAL: To foster and encourage the understanding of all users and partners on the complexity of managing the fishery resource of Lake Erie, to minimize conflict, and to endorse sound fishery management practices.

Lake Erie's fishery resources are managed cooperatively by Ontario and the four U.S. states – New York, Pennsylvania, Ohio and Michigan - bordering the lake through a process set out by the Great Lakes Fishery Commission and the Joint Strategic Plan for Management of Great Lakes Fisheries. Lake St. Clair's fishery resources are managed cooperatively by Ontario and Michigan under the same process.

Cover Photos: (top to bottom) –

- Port Dover staff using electrofishing boat to do evening fish survey near Nanticoke;
- 'Keenosay' conducting young-of-the-year survey in western basin ;
- commercial fisherman removing fish from MNR/OCFA Partnership Index Survey net;
- anglers fishing for bass on Lake St. Clair.

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Lake Erie Management Unit

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2002 Status of Major Stocks

The following is an overview of the status of major species in Ontario waters of Lake Erie for 2002. Lake-wide perspectives are available in the following reports of the Lake Erie Committee (LEC) of the Great Lakes Fishery Commission:

- Walleye Task Group Report
- Yellow Perch Task Group Report
- Forage Task Group Report
- Cold Water Task Group Report

A more detailed account of the results of the 2002 Lake Erie Management Unit (LEMU) core program fisheries assessment activities can be found in LEMU 2002 Status of Major Stocks[1].

Walleye

In 2002, commercial catch rates increased from those observed in 2001. These increases are a result of high survival and the strong 1999 year class continuing to enter the fishery. Unfortunately, the 2002-year class appeared to be one of the weakest as young-of-the-year (YOY) in the west basin interagency trawl index. While the prospect for 2003 recruitment of 2 year old walleye is favorable (the 2001 year class), the 2000 year class was also assessed to be very weak as YOY (confirmed by yearling abundance in the 2001 partnership index program), which will place additional demands on the 1999 and 2001 cohorts in 2003 and 2004.

Walleye in eastern Lake Erie consists of mixed stocks including those originating from east basin shoals, the Grand River, and immigrants from the rest of the lake. Walleye abundance remains at moderate to low levels according to population models and the partnership gill net index. Representation of walleye ages 4 and older was greater in eastern Lake Erie compared to other regions of the lake, based on the age composition of the commercial harvest and the partnership gill net index. The greater average age of walleye in the eastern basin is due in part to the contribution of older migratory individuals originating from the western basin.

Yellow Perch

Yellow perch populations in Lake Erie have undergone large-scale fluctuations in recruitment and survival over the last several decades. High harvest levels during the 1980s could not be sustained through the early 1990s due to low recruitment and year class failures. Increased recruitment during the mid-1990s peaked with the exceptionally strong 1996 year class. This cohort was deemed exceptional in the western basin and strong in outer Long Point Bay based on catches of young-of-the-year fish in index trawls. The magnitude of this year class was later verified, as it accounted for more than half of the 2000 commercial harvest in all areas of Lake Erie. In OE3 this year class continued to be important in 2002, together with 1999 and 1998 (in OE1, OE2 and OE3) cohorts making up the bulk of the commercial fishery. While the YOY of the 2000 year class were observed to be well below average in abundance, the 2001 hatch was considered above average, and will be recruiting to the fishery in 2003. In 2002, yellow perch YOY abundance was observed to be one of the lowest on record. This will have implications for

[1] Lake Erie Management Unit. 2003. 2002 Status of Major Stocks. Technical Report. 39 pp.

the fishery in 2004 as yellow perch populations decline below their recent peak in abundance. In the east basin, this year class was observed to be weak as well.

Generally, synchrony of year class strength exists across regions of Lake Erie, with extremes being most apparent. These similarities reflect environmental conditions that prevail throughout the lake. Differences in cohort abundance that occur between areas or international management units, may be a reflection of discreet spawning populations and habitats which support different fish communities.

Rainbow Smelt

The lake-wide smelt harvest of 7.7 million pounds represented only 49% of the assigned quota in 2002. The lower than quota harvest may be attributed to the declining abundance of smelt and to some extent, market demand. Year class strength continues to oscillate from year to year, possibly driven by the cannibalistic behaviour of yearling smelt and poor survival beyond age 2, the age at which most smelt are mature. Recent recruitment of rainbow smelt has remained below levels of the 1980s and early 1990s, as indicated by outer Long Point Bay index trawling and commercial fishery trends. In 2002, a slight decrease in age 0 smelt was observed, less than one quarter of that observed in 2001.

Lake Whitefish

Ontario's whitefish harvest of 1.0 million pounds in 2002 was down slightly from 2001. The majority of Ontario's harvest (60%) was primarily in late spring in quota area 2 waters. The age composition of the harvest was broad, represented by ages 3 to 10 with a mean age of 6.6 in the west basin. The 1996 and 1997 year classes were the most abundant in the commercial fishery. A large decline in catch-per-unit-effort 2002 with respect to 2001 was observed, with weather related effects on the fishery and poor recruitment through the late 1990s being possible causal factors.

While fishery trends help to describe the status of whitefish stocks, estimating recruitment of younger fish remains a challenge. Whitefish assessment in Lake Erie is complex, due to migratory and schooling behavior of this species. The fall partnership gill net index takes place in eastern Lake Erie during thermal stratification. The central basin is assessed shortly afterwards following fall turnover. During the last two years, whitefish catches have been negligible in the east basin index, though central basin catches ranged from moderate to above average. While observed in moderate numbers in the 2000 partnership index program, up until 2001 there was little evidence of the 1997 year class of whitefish in Lake Erie. However, this year class appeared in good numbers in the 2001 and 2002 fishery. In order to increase our knowledge of whitefish stocks using a fishery independent method, a whitefish spawning survey was planned and executed in the winter of 2002. Ultimately, this survey did not prove informative, since poor weather conditions precluded on water operations for much of the planned index timeframe.

2002 Project Updates

Sport Fishing Regulations

A change was made to the yellow perch daily catch and possession limit which took effect for the waters of the central and western basins of Lake Erie west of longitude 80 degrees 25 minutes 0 seconds and including the Detroit River and Rondeau Bay in 2002. With a resident or non-resident sport fishing licence, the catch and possession limit was 50 yellow perch and 25 yellow perch were permitted with a resident or non-resident conservation licence.

This change was made as part of an ongoing effort by Ontario to continue to take a conservative approach to the harvest of yellow perch, in part by reducing exploitation impacts and achieving consistency with other LEC jurisdictions where possible.

In 2002, the LEMU continued to be actively involved in the OMNR provincial initiative to rationalize and streamline the provincial sport fishing regulations. LEMU staff participated in the walleye and bass tool kit development teams.

Enforcement Update

Sport Fish

Contact was made with 2,872 resident and 1,072 non-resident anglers. As a result, 198 warnings were issued and 147 charges laid. The sport fishing compliance rate was 91.3%

Commercial Fish

Contact was made with 1,740 commercial fish operators. A total of 62 warnings were issued and 47 charges laid. The commercial fishing compliance rate was 93.8%.

Big Game Enforcement

Lake officers assist other districts with their big game hunts and as a result, contact was made with 409 big game hunters. A total of 26 warnings were issued and 11 charges laid. The compliance rate was 91.0%.

Small Game Enforcement

As part of the land/lake interface agreement, Lake Erie officers assist the Aylmer District as needed. Contact was made with 458 small game hunters. A total of 2 warnings were issued and 7 charges laid. The small game compliance rate was 98.1%

Special Investigations

Contact was made with 176 individuals while conducting special investigations.

Lake Intelligence/Investigator

The LII officer made a total of 180 contacts.

Other Enforcement

Other enforcement includes parks and assisting other agencies. Contact was made with 158 residents and 30 non-residents. A total of 2 park related warnings were laid. Compliance rate of 99.0%

Port Officer Program

The Port Officers check on a random basis the five major landing sites on Lake Erie, those being Kingsville, Wheatley, Erieau, Port Stanley and Port Dover. During the 2002/2003 operating season those officers checked a total of 1,057 (10%) of the daily catch reports (DCRs) and issued 30 Violation Notices. The Port Officer Program was affected by the labour disruption and DCR inspections were not conducted for a period of 8 weeks.

Stats from CAVRS from January 1, 2002 to March 13, 2003

Contact	8,741	Compliance	95.7%
Warnings	91	Fines	18,532
Charges	13	Charges Pending	42

Contaminant Monitoring

OMNR participates in both the federal and provincial fish contaminant monitoring programs on Lake Erie. Samples of walleye (western basin), rainbow smelt (central basin) and lake trout (eastern basin) have been collected annually for analysis by the Fisheries and Oceans, Canada (DFO) as part of its Great Lakes Contaminants Surveillance Program (Table 1). Whole body burdens of polychlorinated biphenyls, organochlorine pesticides and trace metals such as mercury have been measured. Lake Erie consistently has the lowest level of contamination of all of the Great Lakes monitored by DFO. Results of these analyses can be obtained from Dr. Mike Whittle, Department of Fisheries and Oceans, Burlington, Ontario.

Fillets from various fish species in Lake Erie are collected regularly and analysed by the Ontario Ministry of Environment and Energy as part of their Sport Fish Monitoring Program (Table 2). The results of these analyses, along with trends and guidelines for consumption, are reported biannually in the publication *Guide to Eating Ontario Sport Fish*.

Table 1a. Number of fish collected by the Lake Erie Management Unit for analysis by Fisheries and Oceans, Canada (DFO) as part of their Lake Erie contaminant monitoring programs, 2002. In general, DFO requests 50 or more fish per species. A blank cell signifies that the species was not required for that region on the lake.

	western basin	**central basin**	**eastern basin**
Walleye	50		
Rainbow smelt		100	100
Lake trout			20
Lake whitefish			
Alewife		100	
Emerald shiner		100	

Table 2. Number of fish collected by the Lake Erie Management Unit for analysis by Ontario Ministry of Environment and Energy (MOEE) as part of their Lake Erie contaminant monitoring programs, 2002. In general, MOEE requests 20 fish per species. A blank cell signifies that the species was not required for that region on the lake.

	Lake St. Clair	Detroit River - upper	Detroit River - lower	western basin	central basin	Rondeau Bay	Long Point Bay	eastern basin
Gizzard shad								
Coho salmon								
Chinook salmon								
Rainbow trout					10			
Lake trout								20
Rainbow smelt								
Lake whitefish					20			11
Northern pike							20	
Suckers								
Common carp					1		9	
Channel catfish				6	20			
White perch				17	20		2	
White bass		20	20	11	20			20
Rock bass								
Pumpkinseed								
Bluegill sunfish								
Smallmouth bass	5			11			20	
Largemouth bass								
Black crappie								
Yellow perch								
Walleye		20	20	20	20			20
Brown bullhead							20	
Freshwater drum		12	1					

Stocking Summary
In 2002, a total of 70,275 yearling trout were stocked into the Ontario waters of Lake Erie.

The MNR Normandale Fish Culture Station (NFCS) stocked 12,875 yearling rainbow trout (average weight 18.1g) into Youngs Creek (below the Vittoria Conservation Area dam) on April 26, 2002.

The NFCS also transferred 65,000 rainbow trout fingerlings and 100,000 brown trout eggs to the Lake Erie Salmon and Trout Club in Port Stanley in fall 2001. These fish were raised in the club's hatchery facility in Port Stanley and were stocked in 2002 as follows:

- 20,000 yearling rainbow trout into Mill Creek in May 2002;
- 33,400 yearling rainbow trout into Erieau Harbour in September 2002;
- 4,000 yearling brown trout into Mill Creek in September 2002.

More detailed information on salmonid stocking into Lake Erie in 2002 by all jurisdictions is provided in the 2002 annual report of the Lake Erie Coldwater Task Group[2].

Botulism Monitoring
Die-offs of fish and birds have become more common in the Great Lakes since 1999. The exact mechanisms are not well understood, although various theories have been proposed and circulated.

Dead fish and birds have been observed in the water and on the shores of Lake Erie for the last several years. The most abundant fish species observed are bottom dwellers, i.e., freshwater drum (sheepshead) and carp, however yellow perch, smallmouth bass, rock bass, and round goby have also been observed.

Cormorants and gulls comprise the majority of dead birds observed in summer die-offs. Other bird species noted in die-offs in 2002 included great blue herons and a bald eagle. In previous years, grebes, mergansers and loons were also among the dead. Die-offs of gulls, loons and mergansers in Lake Erie in the autumns of 1999 and 2000 were attributed to Type E botulism and took place during or following stormy weather. Hot, dry summers and low lake levels have also been thought to provide optimal conditions for growth of *Clostridium botulinum*.

Type E avian botulism is a neuroparalytic disease of wild birds that is caused by protein neurotoxins produced by *C. botulinum*. There are 7 types of botulism toxins produced by *C. botulinum*. The primary type of toxin found in fish-eating birds of the Great Lakes has been Type E. Type E is associated with ingestion of fish and it primarily affects gulls. Several ecological factors must combine to cause birds to die from the toxin.

Clostridium botulinum naturally lives in lakes and river environments. Under normal conditions *C. botulinum* spores are found in anaerobic environments (e.g., aquatic sediments). The spores

[2] Coldwater Task Group. 2002. Report of the Coldwater Task Group to the Standing Technical Committee of the Lake Erie Committee. March 2002. Pp 51.

are resistant and hardy, remaining viable for many years. Therefore, fish species such as freshwater drum, carp and round goby, which live and feed at or near the bottom of the lake, tend to have *C. botulinum* spores in their intestines. Under normal conditions the bacterium does not produce toxin and does not harm fish. Under certain extreme circumstances a sequence of events occurs that causes the *C. botulinum* spores to germinate and produce the toxin.

Die-offs of large numbers of fish at certain times of the year are not uncommon and can be caused by fluctuations in temperature and oxygen. The water is safe for recreational activities, however it is advised that fish that are behaving abnormally or already dead when caught should not be consumed. Fish caught by commercial fisheries are processed through federally registered processing plants. The Canadian Food Inspection Agency regularly inspects fish processing plants and fish products and has yet to find any evidence of Type E toxin in Lake Erie fish in 1999, 2000 and 2001.

On Lake Erie there were reports in 2002 from Ontario, New York, Ohio and Michigan. In the Point Abino area near Fort Erie hundreds of mudpuppies were reported dead in late June, as were dead and dying gulls, freshwater drum and bass. In New York, thousands of dead mudpuppies were reported throughout June and at the end of June reports of hundreds of dead bass and freshwater drum were made. In Ohio, a die-off of freshwater drum, shad and white perch was reported and freshwater drum were reported to have died in Michigan.

A die-off in the eastern basin in September was monitored and reported on by LEMU staff. Reports are included in this document (see Appendix page 14).

The LEMU does monitor some area beaches as needed during fish die-off events and is part of the international research network that is investigating the causes and reporting on botulism in Lake Erie. In addition, staff work closely with the Canadian Wildlife Service to monitor the die-off of fish and birds and to respond as needed to media and public inquiries.

Die-offs were not limited to Lake Erie, there were reports of dead gobies in Lake Huron in mid-June.

2002 Outreach Updates

Angler Outreach

Angler outreach for 2002 was held in five locations. Agenda topics varied depending on the location, with meetings in the east end of the lake focusing on the east basin restoration plan and botulism, and meetings in the west featuring the angler survey being conducted on Lake St. Clair and Detroit River in 2002 and status of the Lake St. Clair fish stocks.

Simcoe – April 13, 2002 (Attendance: not available)

For first time, the angler outreach meeting in Simcoe/Long Point area was combined with the Long Point Bay Anglers Association annual meeting.

Brantford - June 3, 2002 (Attendance: 30)

Questions/Comments:

-why was the commercial yellow perch quota in the east basin doubled in 2002, but the sport fishing daily catch limit was not? the Long Point Bay yellow perch fishery is fantastic right now; why has the yellow perch population skyrocketed? the yellow perch are doing great, but where are the walleye?

-infractions in the Long Point Bay sanctuary are really common right now

-what's the possibility of the Nanticoke area being closed in spring? – should turn it into a sanctuary in spring to protect spawning bass

-will we see increased contaminant levels in yellow perch as a result of the goby-zebra mussel link in the food chain?

Port Colborne – June 4, 2002 (Attendance: 35)

Questions/Comments:

- wondering how much gas I'm going to have to put in my boat to find fish this year
- aren't you discriminating against anglers? Daily catch limit on anglers is still 25
- commercial fishers should be restricted to fishing for perch in the western end of the east basin
- how come there's no yellow perch inshore on the Canadian side when there is lots of perch in the US inshore waters? Is there a difference in the habitat?

-why not stop the commercials from fishing perch in the eastern cap area? Give them the 15,000 pounds down at the Long Point end

- how can you tell if a fish you catch has botulism?
- can we expect any contaminant effects to sportfish from gobies eating zebra mussels?
- what is MNR doing about those cormorants that are eating all my fish?

St. Thomas - June 6, 2002 (Attendance: 16)

Questions/Comments:

-any plans to audit the commercial vessels on the water to establish incidental catch?

-does licence revenue go back into the general coffers or does it go straight to MNR?

-are yellow perch eating round gobies? is this resulting in high contaminant levels in yellow perch?

-why not implement a bass sanctuary in LSC since we know where the spawning beds are?

-commercial yellow perch quota was doubled, but the angler catch limit was not – why? wasn't the yellow perch commercial quota supposed to be held for the duration of the 5 year plan?

-where do the fines go? directly to MNR? do salaries come out of the SPA?
- why are there only 4 port officers when there are more than 4 ports?

Tilbury – June 5, 2002 (Attendance: 20)
Questions/Comments:
-excellent perch fishing this year; concerns about increase in perch quota – commercials got an increase but the anglers have taken cuts in daily catch limits (Ohio angler reduced from 200 to 100 to 30 perch); have never seen perch this large in the Detroit River – why? Is it due to them feeding on gobies?
- what happened to all the bass tagging information?
- problem with mercury contamination in commercially caught fish?
-will Ontario be lowering the limit of walleye during the spring spawn?
-what can we do to get the smelt back
- what are you going to do about all the cormorants?
-muskie are more abundant than ever, so how come we can only use one rod on LSC?
- a lot of people have quit fishing for walleye in the lake and are now fishing the Detroit R
- number one complaint from charter customers is too many sheepshead – also, they would prefer to catch walleye rather than rainbow

Commercial Outreach
In 2002, commercial outreach meetings were held at the Port Dover Fisheries Station, the Port Stanley Fire Hall, and the Wheatley Legion Hall in February. Many members of the commercial fishing industry attended, as did staff from the LEMU.

At each meeting the Lake Manager provided some introductory comments about the fisheries and work being done by the LEMU and the LEC. Attendees were invited to ask questions and provide comments.

2002 Project Reports

Two project reports written in 2002 are included in the Appendix at the end of the annual report.

A survey of dead fish and birds along selected beaches in Long Point Bay, Lake Erie
September, 2002
Prepared by: T. MacDougall

This report describes a shoreline survey completed by the Lake Erie Management Unit in response to reports of a fish die-off over the Labour Day weekend (August 30th – September 2nd). Residents of the region reported seeing dead fish as early as August 27-28th but the largest numbers appeared over the course of the weekend. A steady East/ Northeast wind continued to deposit fish and birds onto area beaches throughout the weekend and into the early week of September 1st. A total of over 2.8 kilometers of shoreline were examined. All areas, with the exception of the south shore of Long Point, contained a large number and variety of fish species in various states, from freshly dead to several days old. In addition dead ring billed gulls and cormorants were present at most areas.

Summary of lake conditions during fish/bird die-off in Long Point Bay, late August, 2002
October, 2002
Prepared by: L. Witzel

This report examines lake conditions that existed leading up to and during the major fish/bird die-off in Long Point Bay, Lake Erie during August 2002. Physical lake data (e.g., temperature and wind speed) were examined for possible linkages to the die-off event. An upwelling event, an incursion of cold water and winds that ranged from predominately light (force 3) to fresh force 5 breezes were identified. The August 18-19th thermal event was the most significant upwelling of cold water observed in the Port Dover area during 2002.

Dead fish/birds began appearing in Long Point Bay around August 27-29th. There is no evidence of a coincident thermal event however, there is some evidence that water masses within Long Point Bay and beyond were dynamic at this time. For the most part, lake winds prevailed from an easterly point during the week that followed the initial appearance of dead fish/birds (approx. August 27th). Such conditions would be expected to deposit dead/floating animals along beaches in the west side of Long Point Bay.

2002 LEMU Staff

London
659 Exeter Road, London, ON N6E 1L3
519-873-4610

Mike Morencie, Lake Manager
Bill Lafferty, Enforcement Supervisor
Luca Cargnelli, A/Management Biologist/Team Leader
Elizabeth Wright, Management Biologist
John Johnson, Provincial Commercial Fisheries Coordinator
John Cooper, Information/Communication Specialist
Cheryl Orr, Administrative Assistant/Financial Officer

Port Dover
P.O. Box 429, Port Dover, ON N0A 1N0
519-583-0981

Phil Ryan, Fisheries Ecology Supervisor
Dixie Greenwood, Operations Coordinator
Gord Ives, Boat Captain
Tony Marshall, Boat Captain
Wyatt Hall, Fisheries Technician
Tom MacDougall, Assessment Biologist
Larry Witzel, Assessment Biologist
Duncan Hall, Conservation Officer

Seasonal Staff
Erin Arnold, Fisheries Technican
Lori Richardson, Fisheries Technican
Heather Whitford, Fisheries Technican
Tina Werner, Data Clerk
Kevin Sprague, Conservation Officer

Aquatic Ecosystems Science Section, Port Dover
Brian Shuter, Research Scientist

Port Stanley
Seasonal Staff
Jeff Anderson, Port Officer
Duncan Norrie, Port Officer

Aylmer
Cliff Rich, Conservation Officer

Wheatley
R.R. #2, 320 Milo Road, Wheatley, ON
N0P 2P0 519-825-4684

Brian Locke, Fisheries Assessment Supervisor
Don MacLennan, Assessment Biologist
Andy Cook, Assessment Biologist
Bruce Morrison, Assessment Biologist
Al Matthews, Operations Coordinator
Larry Laforet, Fisheries Technician
Stan Powell, Fisheries Technician
Aida Baptista, Data Entry Operator
Debbie Warner, Clerk Typist
Bob Sutherland, Systems Officer
Rob Dietz, Conservation Officer
Sean Insley, Conservation Officer

Seasonal Staff
Megan Belore, Assessment Biologist
Craig McDonald, Fisheries Technician
Gayle Dawson, Fisheries Technician
Steve Derbyshire, Fisheries Technician
Rod Wilmont, Fisheries Technician
Amanda Dawson, Resource Technician
Jason Cunningham, Resource Technician
David Grass, Resource Technician
Krista Sampson, Resource Technician
Pauline Dietz, Systems Officer
Jodi Foster, Data Evaluation Clerk
Kit Laforet, Data Evaluation Clerk
Darrell Mullowney, Fisheries Intern
Colin Stass, Port Officer
John Veniot, Port Officer

Aquatic Ecosystems Science Section, Wheatley
Tim Johnson, Research Scientist

Seasonal Staff
Vicki Lee, Aquatic Research Assistant

Niagara
Rick Dupuis, Conservation Officer

Blenheim
Scott McCharles, Conservation Office

Appendix

A survey of dead fish and birds along selected beaches in Long Point Bay, Lake Erie
Prepared by: T. MacDougall

Summary of lake conditions during fish/bird die-off in Long Point Bay, late August, 2002
Prepared by: L. Witzel

A survey of dead fish and birds along selected beaches
in Long Point Bay, Lake Erie
September, 2002
Prepared by: T. MacDougall

Summary

Shorelines between Nanticoke and Long Point were surveyed on September 3rd and 4th by the Lake Erie Management Unit, in response to reports of a fish die-off over the Labour Day weekend (August 30th – September 2nd). Residents of the region reported seeing dead fish as early as August 27-28th but the largest numbers appeared over the course of the weekend. A steady East/ Northeast wind continued to deposit fish and birds onto area beaches throughout the weekend and into the early week of September 1st. A total of over 2.8 kilometers of shoreline were examined along sections in the following areas: Centre Creek, Port Dover beach (in the vicinity of the municipal water intake), Port Ryerse beach, Normandale beach, Turkey Point beach, and sections of Long Point beach (south side of the point) (Fig. 1). All areas, with the exception of the south shore of Long Point, contained a large number and variety of fish species in various states, from freshly dead to several days old. In addition dead ring billed gulls and cormorants were present at most areas.

A total of 19 animal species were found in the two-day survey: 15 fish species, an amphibian (mudpuppy) and three avian species (Table 1). Anecdotal accounts of other bird species were also noted (loons, herons). The fish species represent a wide range of ecological niches; demersal, pelagic, warmwater, and some migratory coldwater species were observed. Some sections of shoreline, in particular those in the vicinity of cottages and houses, had been cleaned repeatedly over the weekend (see Table 2), while other sections remained relatively untouched. Enumerating the untouched sections of shoreline (1,696 metres) produced total relative species numbers as follows:

Table 1. Relative numbers of animal species observed on Lake Erie eastern basin shorelines during OMNR surveys, September 3-4, 2002.

Species	Total observed
freshwater drum	821
yellow perch	153
rock bass	49
smallmouth bass	30
bullhead catfish	29
gizzard shad	7
round goby	5
carp	4
common white sucker	3
rainbow trout	3
bluegill sunfish	2
whitefish	2
white bass	1
northern pike	1
walleye	1
mudpuppy	2
cormorant	14
gull	9
shorebird (unknown species)	1

The observed fish were predominantly freshwater drum (73% overall). Other frequently observed species include yellow perch (14%), rock bass (4%), smallmouth bass (3%), and bullhead catfish (3%). Between Nanticoke and Turkey Point the density of dead fish ranged between 0.4 and 1.8 fish per metre. The density of dead birds ranged from 0.8 to 7 per 100 metres in the same areas (Table 2). There were fewer dead fish (1 fish per 100-m) and no dead birds observed on the south shoreline of Long Point. An estimated 38, 076 dead fish were present on the entire shoreline (Turkey Point to Nanticoke Ck.) during the survey.

Two ring-billed gulls in a distressed state (sluggish, poor muscle control) were captured for botulism (type E) tests. In addition, one yellow perch and one freshwater drum, both dying, were collected and frozen. One of the gulls was delivered live, to the pathology dept. at the University of Guelph. The second gull, expired in captivity, was subsequently frozen and, along with the yellow perch and drum, was also submitted for analysis.

Residents and public beach users were encountered at most locations and voiced concern over the numbers of dead fish. Their priorities, in approximate order, were: 1) to know what had caused the event, 2) whether the water was safe to bathe in, 3) whether fish caught in the lake were safe to eat, 4) to know what proper/safe disposal techniques are, and 5) whether a government service would clean their beaches for them.

Individual Surveys

September 3, 2002

Port Dover

A 92 metre section of shoreline in front of the municipal water intake (at 42° 46.997'N, 80° 12.941'W) was surveyed. Fish were encountered at regular intervals along the accessible shoreline. Of the 50 fish observed, most were freshwater drum (54%) and yellow perch (26%) (Table 2). Most were whole but had been dead for a period of time. One yellow perch in the shallows was distressed but still alive and was kept on ice (later frozen) for tissue analysis.

We spoke to John Waterman (Hamilton resident) who windsurfs regularly in Long Point Bay. He expressed concern over the numbers of dead fish and described health problems that he correlated with being in the water near Turkey Point for 6 hours on Aug. 27 (head symptoms: phlegm, sinus and eye irritation). He was advised to contact the Ministry of Health.

Normandale Beach

We surveyed 74 metres of beach just east of pier at 42° 42.538'N, and 80° 18.568'W. Cottages front this piece of shoreline. Fifty-two dead fish, predominantly freshwater drum (43%) and yellow perch (23%) were observed at regular intervals (Table 2).

We spoke to a resident who informed us that the beach had been cleaned repeatedly over the weekend, the last time being the afternoon of September 2 (survey counts therefore represent a 24 hour accumulation). Some dead fish were found earlier in the previous week but numbers increased on the weekend. Approximately 40 fish per day, 4 cormorants, and "several" gulls were removed from one 8-m section of beach between Friday and Monday. The resident expressed concern about bathing in the water and inquired about proper disposal techniques.

The section of beach fronting the cottage to the immediate west of the pier was surveyed with the cottage owner. He described first seeing dead fish on Friday but noticed an increase over the weekend. From Saturday to Monday he removed 15 "household pails" of fish and 2 cormorants. The 10m of beachfront had been cleaned at 10:00 am; 1.5 hours later 4 freshwater drum and 1 brown bullhead were observed.

A section of shoreline west of the developed cottage area was surveyed, approximately 334m between 42° 42.519'N, 80° 18.650'W and 42° 42.399'N, 80° 18.833'W. We presumed that this section of shoreline had been cleared of dead fish. A larger variety of fish was observed, compared to the more developed shoreline. Of the fish found freshwater drum predominated (73%) follwed by yellow perch (17%), smallmouth bass (3%), and rock bass (6%) (Table 2). Also observed were six dead cormorants and 5 dead gulls; a sixth sickly gull was captured for examination.

Turkey Point

We surveyed a 175m section of beach fronting a roadway and several cottages, just east of the Turkey Point road; from 42° 41.698'N, 80° 19.463'W to 42° 41.778'N, 80° 19.394W. We presumed that local residents had not cleaned this section. 122 dead fish were found, predominantly freshwater drum (74%) and yellow perch (21%). As well there was one dead gull and one unidentified shorebird (kept on ice) (Table 2).

The shoreline east of the developed cottage area was surveyed; approximately 385-m from 42° 41.822'N, 80° 19.349'W, to 42° 41.966'N, 80° 19.194'W. We presumed that this section of shoreline had not have been cleaned. A variety of dead fish were observed; predominantly freshwater drum (74%), but also yellow perch (10%), bullhead catfish (5%), rock bass (5%) and smallmouth bass (4%). Two rainbow trout, approximately 300mm in total length, were noted (Table 2).

Long Point Beach (west side of Long Point)

We surveyed approximately 333-m of public beach at the base of Long Point from 42 34.655'N, 80° 26.423'W to 42° 34.667'N, 80° 26.179'W. Very little debris had washed up in this section of beach. Only two dead freshwater drum and one dead walleye were observed.

A section of beach within Long Point provincial park on either side of the public access area was examined; approximately 578m between 42° 34.728'N, 80° 23.520'W and 42° 34.675'N, 80° 23.102'W. Very few dead fish were found. Eight freshwater drum and one walleye were observed.

The park supervisor, John Marchington, related that some fish had washed up early in the previous week but that the numbers had peaked on Thursday (Aug. 28th) when park staff removed 7 gulls and 12 fish. He related second-hand accounts from anglers of dead/distressed fish and birds in Inner Long Point Bay including "hundreds" of fish and four blue herons around Pottahawk Point.

We also spoke to Ron DeSerrano (proprietor of "Rotten Ronnie's Bait and Tackle") in Long Point who described encountering one dead fish (90% freshwater drum but also yellow perch and northern pike) "every 100 yards" while motoring in Inner Long Point Bay on the weekend. He counted 12 dying gulls and gave second-hand accounts of other anglers encountering dying loons and cormorants.

Michael Bradstreet, of Bird Studies Canada / Long Point Bird Observatory, reported seeing dead fish while on a boat trip to Long Point on Aug. 29/30. During the trip from Old Cut to Long Point he counted: 268 sheepshead; 16 yellow perch; 4 bullheads, and 3 bass (smallmouth?). He only counted those within close proximity of his 16' aluminum boat. On Thursday he noted many sick and dying birds on the water and on Friday they appeared to be on shore rather than on the water.

September 4, 2002

Centre Creek

We surveyed 42m of shoreline to the east of Centre creek, from 42° 47.414'N, 80° 06.235'W to 42° 47.425'N, 80° 06.262'W. Large quantities of beached, rotting *Cladophora* sp. algae prevented observation of some of the shoreline and likely hid several dead fish/birds. Of the 76 fish observed 76 percent were freshwater drum (Table 2). Two gulls and one cormorant were also observed. A freshly dead rainbow trout and two whitefish were two notable coldwater species observed.

Port Rverse

A 516m section of shoreline, west of the cottages near Young's Creek was examined; from 42° 45.143'N, 80° 15.616'W to 42° 47.425'N, 80° 15.900'W. Of the 213 dead fish observed, most were freshwater drum (83%). Four cormorants and two gulls were also counted. One dying freshwater drum was retained on ice, and later frozen, for botulism analysis.

We spoke to several residents from the cottage area close to Young's Creek who described cleaning fish and birds off of the beach for most of the weekend. One individual related burying 39 fish from 65 ft. of beachfront over the period of Aug. 30 to Sept. 3.

Estimates of Overall Fish Numbers

An estimate of total dead fish present along the Long Point Bay shoreline during the survey was made based on average densities in three sections: i) The tip of Turkey Point to just east of Normandale, ii) east of Normandale to the pier at Port Dover, and iii) the pier at Port Dover to Nanticoke Ck. A total of 38, 076 fish were estimated to have died (Table 3). This number represents a minimum number of fish killed; it doesn't include fish cleaned up by local residents during the days preceding the survey or the fish that were not washed ashore. By using the rate obtained at Normandale, of 0.7 fish / metre of shore / 24-hours, an estimate for the Turkey Point to Nanticoke Creek shoreline over a three day period is 68, 125 fish (Table 3.)

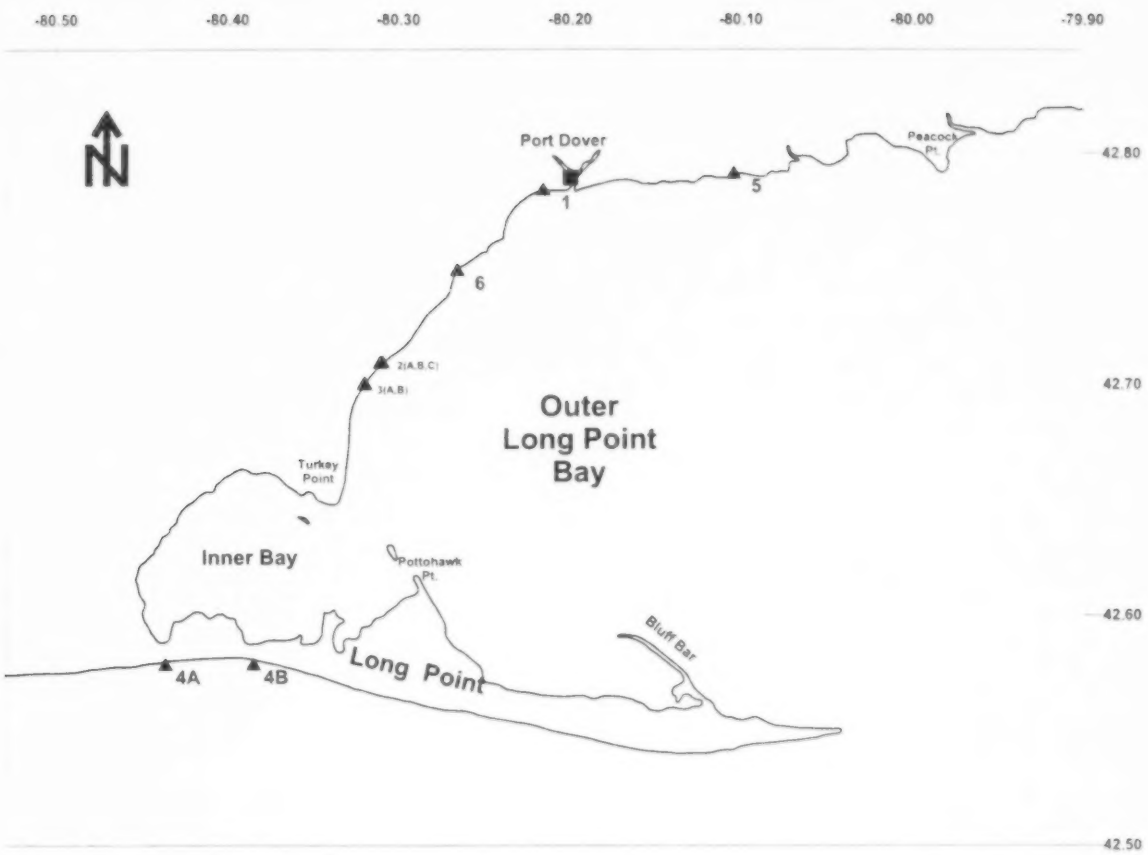

Figure 1. Locations of transects surveyed on September 3rd and 4th, 2002. Individual sites are demarcated as follows: 1. Port Dover, 2. Normandale, 3. Turkey Point, 4. Long Point, 5. Centre Creek, 6. Port Ryerse.

Table 2. Detailed dead-animal counts and length of shoreline surveyed during September 3/4, 2002 examination of fish kill reported in Long Point Bay area of Lake Erie.

	Port Dover	Normandale A	Normandale B	Normandale C	Turkey Point A	Turkey Point B	Long Point A	Long Point B	Centre Creek	Port Ryerse
distance covered (m)	92	74	10	334	175	385	333	900	42	510
FISH										
freshwater drum	27	32	4	296	90	291	2	8	58	177
yellow perch	13	17	-	70	25	42	-	-	4	24
smallmouth bass	4	-	-	11	1	14	-	-	1	-
round gobie	2	-	-	3	-	-	-	-	-	-
gizzard shad	2	2	-	-	-	2	-	-	3	-
carp	0	-	-	1	-	2	-	-	1	-
common white sucker	1	-	-	1	-	-	-	-	-	1
rock bass	1	1	-	22	4	19	-	-	2	5
bullhead catfish	-	-	1	2	1	19	-	-	3	5
bluegill sunfish	-	-	-	1	-	1	-	-	-	-
white bass	-	-	-	-	-	-	-	-	-	1
whitefish	-	-	-	-	-	-	-	-	2	-
northern pike	-	-	-	-	-	-	-	-	1	-
walleye	-	-	-	-	-	-	1	1	-	-
salmonid (r. trout)	-	-	-	-	-	2	-	-	1	-
AMPHIBIANS										
mudpuppy	-	-	-	-	-	2	-	-	-	-
BIRDS										
cormorant	-	-	-	6	-	3	-	-	1	4
gull	-	-	-	5	1	-	-	-	2	2
shorebird	-	-	-	-	1	-	-	-	-	-
Beach cleaned?	no	24 hours earlier	2 hours earlier	no	unknown	no	unknown	yes	no	no
number of fish / 1-m of shoreline	0.54	-	-	1.22	-	1.02	0.01	-	1.81	0.42
number of birds / 100-m of shoreline	0.00	-	-	3.29	-	0.78	0.00	-	7.14	1.18

Table 2. Estimates of total dead fish present on the Long Point Bay shoreline from Turkey Point to Nanticoke Creek during a survey conducted on September 3 and 4, 2002.

Sections of Shoreline	**Distance (m)**	**Mean number of fish per metre**	**Estimated number of fish**
Turkey Point to east of Normandale	10,320	1.120	11,558
West of Port Ryerse to Port Dover pier	9,996	0.480	4,798
Port Dover to Nanticoke Ck.	12,000	1.810	21,720
			38,076
Total Shoreline	**Estimated number over 3 days** (based on Normandale Beach section A; 52 fish / 74 m / 24 hr)		
1. Turkey Point to Nanticoke Ck.			68,125.62
2. Turkey Point to Grand River			178,029.73

Summary of lake conditions during fish/bird die-off
in Long Point Bay, late August, 2002
October, 2002
Prepared by: L. Witzel

Executive Summary

This report examines Lake Conditions that existed leading up to and during the major fish/bird die-off in Long Point Bay, Lake Erie during August 2002.

The types and source of physical lake data examined for possible linkages to the die-off event were as follows: 1) whole-lake surface temperature maps of Lake Erie acquired from the GLFS web page (http://superior.eng.ohio-state.edu/) and presented as daily point-in-time (08:00 h) colour-coded charts of surface water temperatures rendered from modeled outputs of satellite images. 2) a detailed time-series of water temperatures (2-hr observations) recorded at Port Dover's municipal water intake; data acquired via Optic Stowaway temperature logger (ID# 387287), 3) hourly observations of wind speed and wind direction measured at the Environment Canada weather station located near the tip of Long Point (ID# 6134F10); data were averaged for 8-h periods, and 4) hourly observations of lake elevation measured at Port Dover and Port Colborne; data acquired in graph format from the Canadian Hydrographic Service web page (http://chswww.bur.dfo.ca/danp/Graphs/).

GLFS surface temperature maps indicate an upwelling event developed in Long Point Bay beginning about August 14th, 2002 (Figure 1). The center of the upwelling was along the north side of Long Point peninsula, between Pottohawk Point and Bluff Bar (Figure 2). The mid-August upwelling expanded outward into the central and northern regions of Long Point Bay during the next five days. Nearshore water temperature at the Port Dover municipal water intake during this period was between 24 and 25 °C (Figure 3). Wind conditions in the Long Point area leading up to August 14 were predominately light (force 3) to moderate breezes (force 4) from the south and southwest, peaking as force 5 (31-40 km/h) fresh breezes during the early hours on August 14th (Table 1a,b). An incursion of cold water developed in the Port Dover area on August 18th as evidenced by a sudden 7-8 °C decrease in water temperature at the municipal water intake station (Figure 3). This event likely resulted from a northeasterly expansion of a cold water mass that originated from the August 14th upwelling near Long Point. Force 4 to force 5 winds (21-40 km/h) blew from the south and southwest during the August 14-18th period, contributing to a northeastern movement of the cold water mass.

The August 18-19th thermal event was the most significant upwelling of cold water observed in the Port Dover area during 2002 (Figure 3). Temperature minima during this event was 16.6 °C, observed at 12:00 h on the 19th. It was followed by a warming trend that proceeded quickly at first, reaching 22.1 °C by August 22nd and then slowly over the next 12 days (to September 4th) without any further major shifts in temperature.

Dead fish/birds began appearing in Long Point Bay around August 27-29th. There is no evidence of a coincident thermal event. In fact, during this time nearshore water temperatures at Port Dover (intake station) were relatively stable at 22-23 °C and surface temperatures throughout

Long Point Bay were uniform at 22 ± 1 °C from August 25 to 28th and at 20 ± 1 °C to 22 ± 1 °C from August 29 to 30th (Figure 4).

Although available temperature data do not indicate any significant thermal event occurring coincident with the appearance of dead fish/birds, there is some evidence that water masses within Long Point Bay and beyond were dynamic at this time. Lake level at both Port Dover (Figure 5) and Port Colborne (Figure 6) dropped abruptly during August 27-28th in response to strong east and northeasterly breezes that prevailed on those days (Table 1a,b). On August 29th wind conditions in the Long Point region had diminished while shifting briefly to the southeast. From August 30th to September 2nd, wind speeds were variable between force 2 and 5 and predominately from an easterly component (Table 1a,b). For the most part, lake winds prevailed from an easterly point during the week that followed the initial appearance of dead fish/birds (approx. August 27th). Such conditions would be expected to deposit dead/floating animals along beaches in the west side of Long Point Bay.

Table 1a. Average wind direction and speed (Dir @ km/h) observed at the Long Point weather station for daily 8-h periods during August, 2002. Values in brackets describe wind speed according to the Beaufort Wind Scale.

Date	Week Day	Period of Day		
		1:00 to 8:00 h	9:00 to 16:00 h	17:00 to 24:00
1-Aug	Thurs	S @ 15 (force 3)	SW @ 19 (force 3)	S @ 17 (force 3)
2-Aug	Fri	SW @ 25 (force 4)	SW @ 20 (force 3)	NW @ 30 (force 4)
3-Aug	Sat	N @ 22 (force 4)	NE @ 12 (force 2)	NE @ 8 (force 2)
4-Aug	Sun	SE @ 11 (force 2)	S @ 14 (force 3)	SW @ 17 (force 3)
5-Aug	Mon	NW @ 16 (force 3)	W @ 14 (force 3)	NW @ 41 (force 6)
6-Aug	Tues	N @ 48 (force 6)	NE @ 20 (force 3)	SE @ 17 (force 3)
7-Aug	Wed	N @ 31 (force 5)	NE @ 13 (force 3)	SW @ 13 (force 3)
8-Aug	Thurs	N @ 26 (force 4)	NE @ 11 (force 2)	S @ 4 (force 1)
9-Aug	Fri	N @ 14 (force 3)	E @ 10 (force 2)	E @ 8 (force 2)
10-Aug	Sat	SE @ 9 (force 2)	SW @ 9 (force 2)	NE @ 7 (force 2)
11-Aug	Sun	S @ 13 (force 3)	SW @ 22 (force 4)	S @ 16 (force 3)
12-Aug	Mon	S @ 12 (force 2)	SW @ 25 (force 4)	S @ 28 (force 4)
13-Aug	Tues	S @ 27 (force 4)	SW @ 16 (force 3)	SE @ 23 (force 4)
14-Aug	Wed	S @ 33 (force 5)	SW @ 20 (force 3)	S @ 27 (force 4)
15-Aug	Thurs	S @ 28 (force 4)	SW @ 26 (force 4)	S @ 20 (force 3)
16-Aug	Fri	S @ 36 (force 5)	SW @ 41 (force 6)	SW @ 24 (force 4)
17-Aug	Sat	S @ 26 (force 4)	SW @ 29 (force 4)	S @ 25 (force 4)
18-Aug	Sun	SW @ 37 (force 5)	SW @ 28 (force 4)	W @ 18 (force 3)
19-Aug	Mon	E @ 14 (force 3)	S @ 22 (force 4)	SW @ 26 (force 4)
20-Aug	Tues	N @ 29 (force 4)	NE @ 11 (force 2)	W @ 8 (force 2)
21-Aug	Wed	NE @ 11 (force 2)	NE @ 16 (force 3)	E @ 14 (force 3)
22-Aug	Thurs	S @ 25 (force 4)	SW @ 37 (force 5)	NW @ 26 (force 4)
23-Aug	Fri	NE @ 40 (force 5)	NE @ 38 (force 5)	NE @ 25 (force 4)
24-Aug	Sat	N @ 22 (force 4)	W @ 13 (force 3)	W @ 24 (force 4)
25-Aug	Sun	NW @ 18 (force 3)	SW @ 10 (force 2)	SW @ 13 (force 3)
26-Aug	Mon	NW @ 12 (force 2)	NE @ 6 (force 2)	SW @ 9 (force 2)
27-Aug	Tues	E @ 38 (force 5)	NE @ 41 (force 6)	NE @ 46 (force 6)
28-Aug	Wed	NE @ 47 (force 6)	NE @ 31 (force 5)	E @ 19 (force 3)
29-Aug	Thurs	SE @ 14 (force 3)	SE @ 7 (force 2)	NE @ 22 (force 4)
30-Aug	Fri	NE @ 15 (force 3)	NE @ 10 (force 2)	W @ 10 (force 2)
31-Aug	Sat	E @ 20 (force 3)	NE @ 15 (force 3)	E @ 26 (force 4)

Table 1b. Average wind direction and speed (Dir @ km/h) observed at the Long Point weather station for daily 8-h periods during September, 2002. Values in brackets describe wind speed according to the Beaufort Wind Scale.

Date	Week Day	Period of Day		
		1:00 to 8:00 h	9:00 to 16:00 h	17:00 to 24:00
1-Sep	Sun	SE @ 36 (force 5)	E @ 14 (force 3)	E @ 26 (force 4)
2-Sep	Mon	S @ 26 (force 4)	SE @ 16 (force 3)	SE @ 23 (force 4)
3-Sep	Tues	S @ 36 (force 5)	SW @ 36 (force 5)	W @ 21 (force 4)
4-Sep	Wed	W @ 26 (force 4)	SW @ 24 (force 4)	NW @ 28 (force 4)
5-Sep	Thurs	N @ 24 (force 4)	E @ 12 (force 2)	SW @ 12 (force 2)
6-Sep	Fri	NE @ 19 (force 3)	SE @ 8 (force 2)	E @ 13 (force 3)
7-Sep	Sat	E @ 10 (force 2)	E @ 10 (force 2)	E @ 13 (force 3)
8-Sep	Sun	S @ 12 (force 2)	S @ 10 (force 2)	SE @ 7 (force 2)
9-Sep	Mon	S @ 4 (force 1)	S @ 12 (force 2)	SW @ 14 (force 3)
10-Sep	Tues	SW @ 16 (force 3)	SW @ 24 (force 4)	W @ 30 (force 4)
11-Sep	Wed	NW @ 51 (force 7)	NW @ 33 (force 5)	NW @ 38 (force 5)
12-Sep	Thurs	N @ 18 (force 3)	SW @ 21 (force 4)	SW @ 28 (force 4)
13-Sep	Fri	S @ 33 (force 5)	SW @ 30 (force 4)	S @ 19 (force 3)
14-Sep	Sat	SE @ 20 (force 3)	S @ 37 (force 5)	S @ 30 (force 4)
15-Sep	Sun	SW @ 25 (force 4)	NE @ 21 (force 4)	N @ 29 (force 4)
16-Sep	Mon	NW @ 14 (force 3)	E @ 11 (force 2)	W @ 17 (force 3)
17-Sep	Tues	SW @ 7 (force 2)	SW @ 18 (force 3)	W @ 9 (force 2)
18-Sep	Wed	SE @ 12 (force 2)	E @ 15 (force 3)	E @ 12 (force 2)
19-Sep	Thurs	S @ 32 (force 5)	S @ 23 (force 4)	SE @ 32 (force 5)
20-Sep	Fri	S @ 34 (force 5)	S @ 28 (force 4)	SE @ 34 (force 5)
21-Sep	Sat	S @ 41 (force 6)	SW @ 31 (force 5)	SW @ 14 (force 3)
22-Sep	Sun	S @ 19 (force 3)	S @ 22 (force 4)	W @ 35 (force 5)
23-Sep	Mon	W @ 20 (force 3)	SW @ 13 (force 3)	SW @ 13 (force 3)
24-Sep	Tues	S @ 29 (force 4)	SW @ 31 (force 5)	W @ 22 (force 4)
25-Sep	Wed	NE @ 30 (force 4)	NE @ 26 (force 4)	NE @ 20 (force 3)
26-Sep	Thurs	SE @ 28 (force 4)	SE @ 23 (force 4)	SE @ 23 (force 4)
27-Sep	Fri	E @ 19 (force 3)	NE @ 33 (force 5)	NW @ 36 (force 5)
28-Sep	Sat	NW @ 31 (force 5)	NE @ 22 (force 4)	NE @ 20 (force 3)
29-Sep	Sun	S @ 18 (force 3)	SW @ 19 (force 3)	S @ 15 (force 3)
30-Sep	Mon	S @ 33 (force 5)	S @ 28 (force 4)	S @ 26 (force 4)

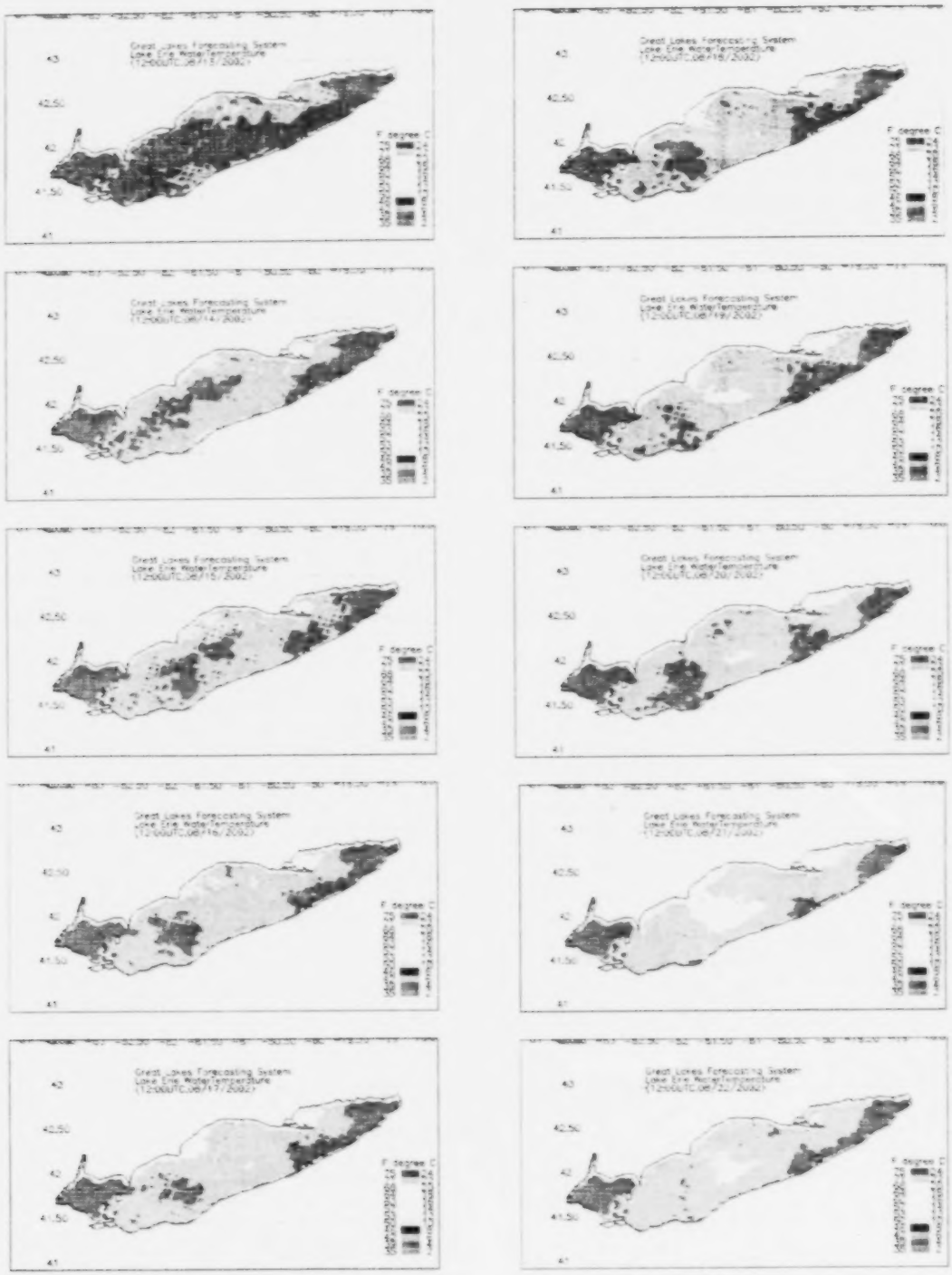

Figure 1. Great Lakes Forecasting System surface temperature maps, Lake Erie, August 13-22, 2002.

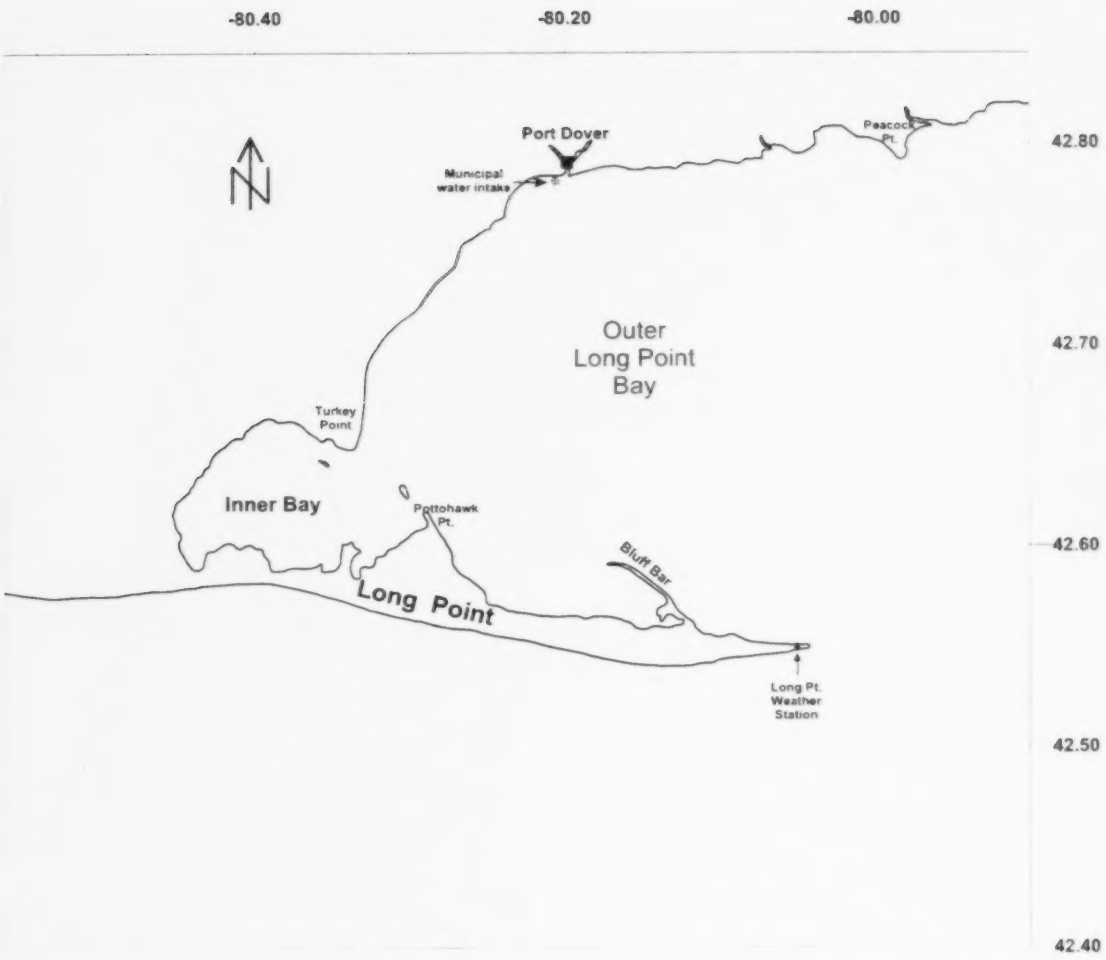

Figure 2. Major features of the Long Point Bay region of Lake Erie.

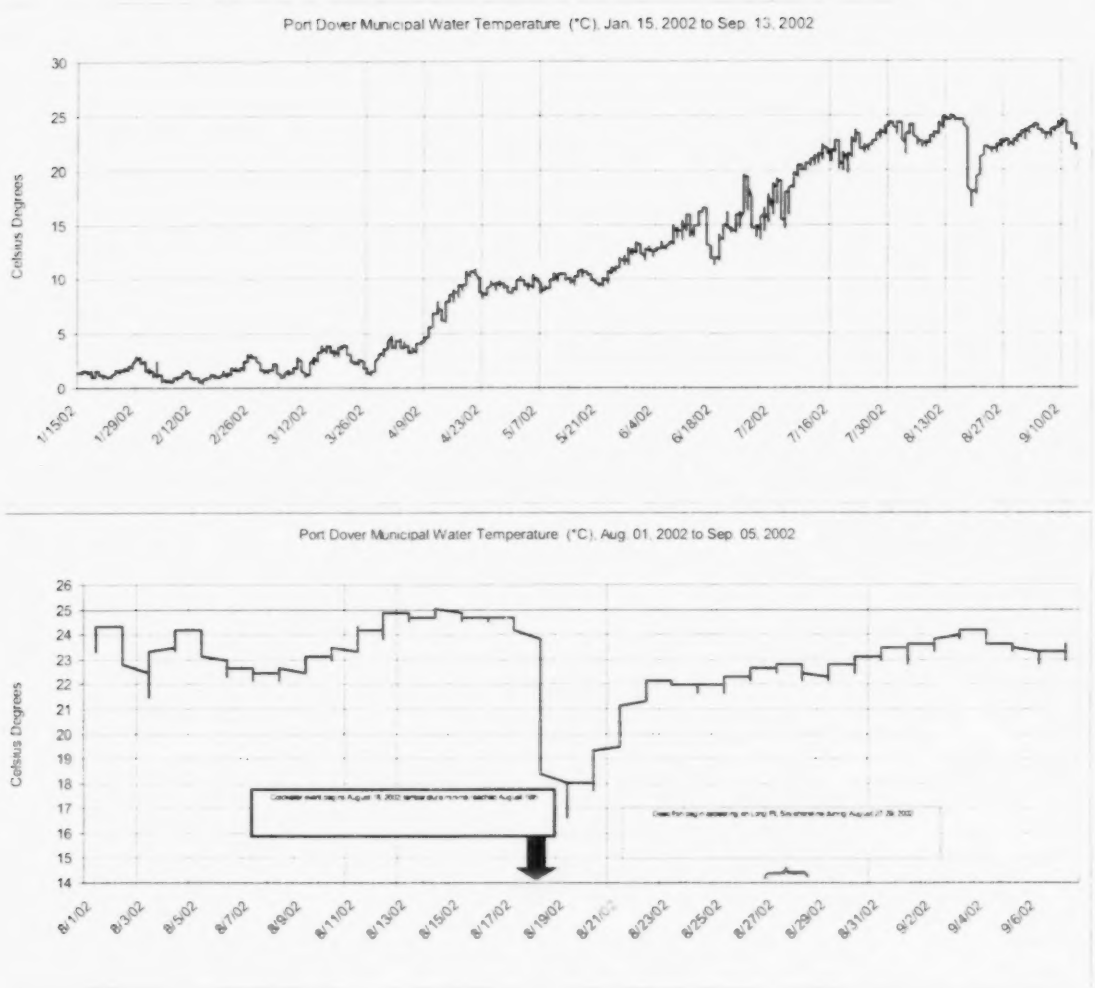

Figure 3. Water temperatures observed at Port Dover's municipal water intake station during January-September, 2002 (Top), and details of the August 18-19 coldwater event (Bottom).

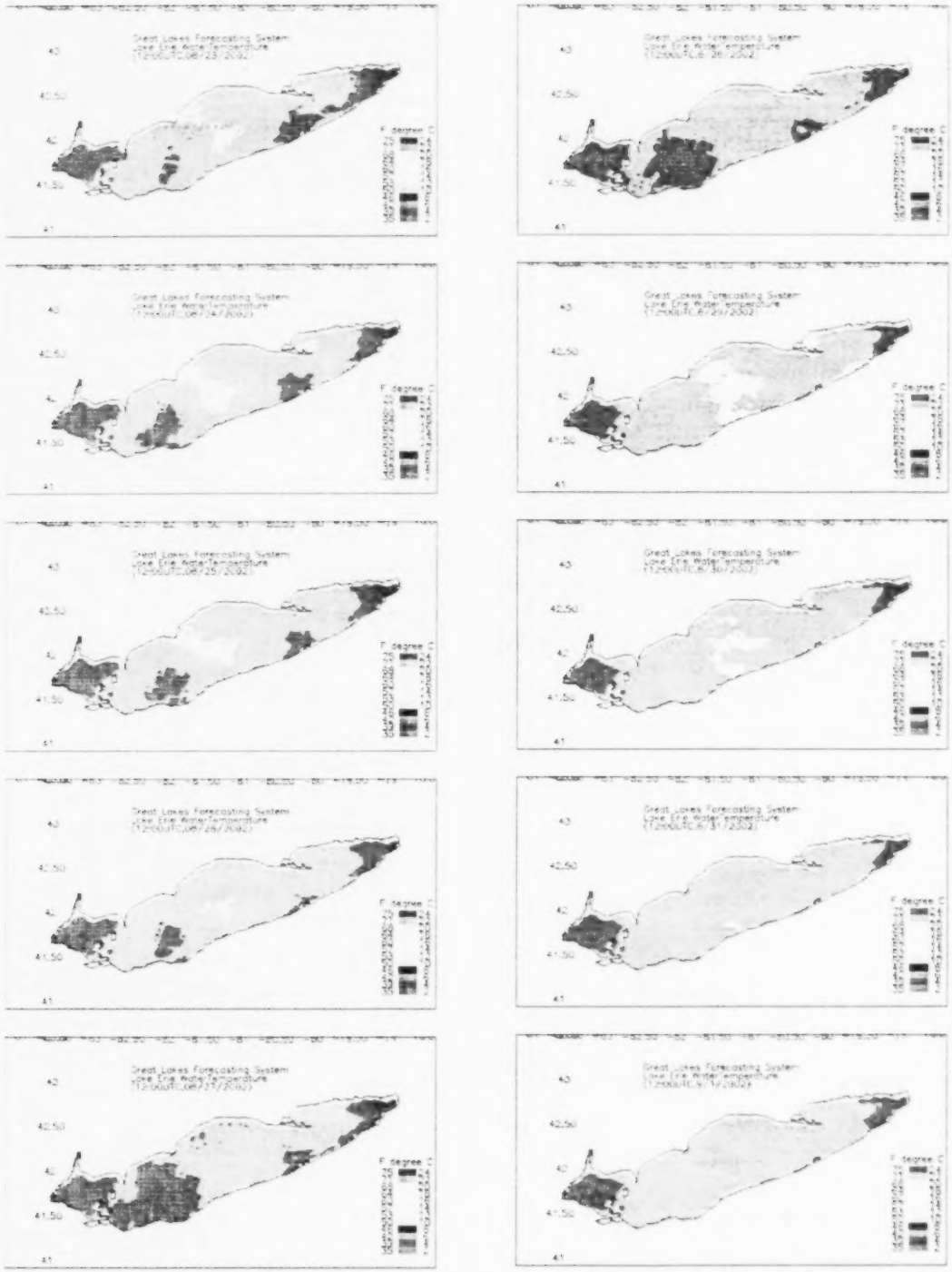

Figure 4. Great Lakes Forecasting System surface temperature maps, Lake Erie, August 23-September 1, 2002.

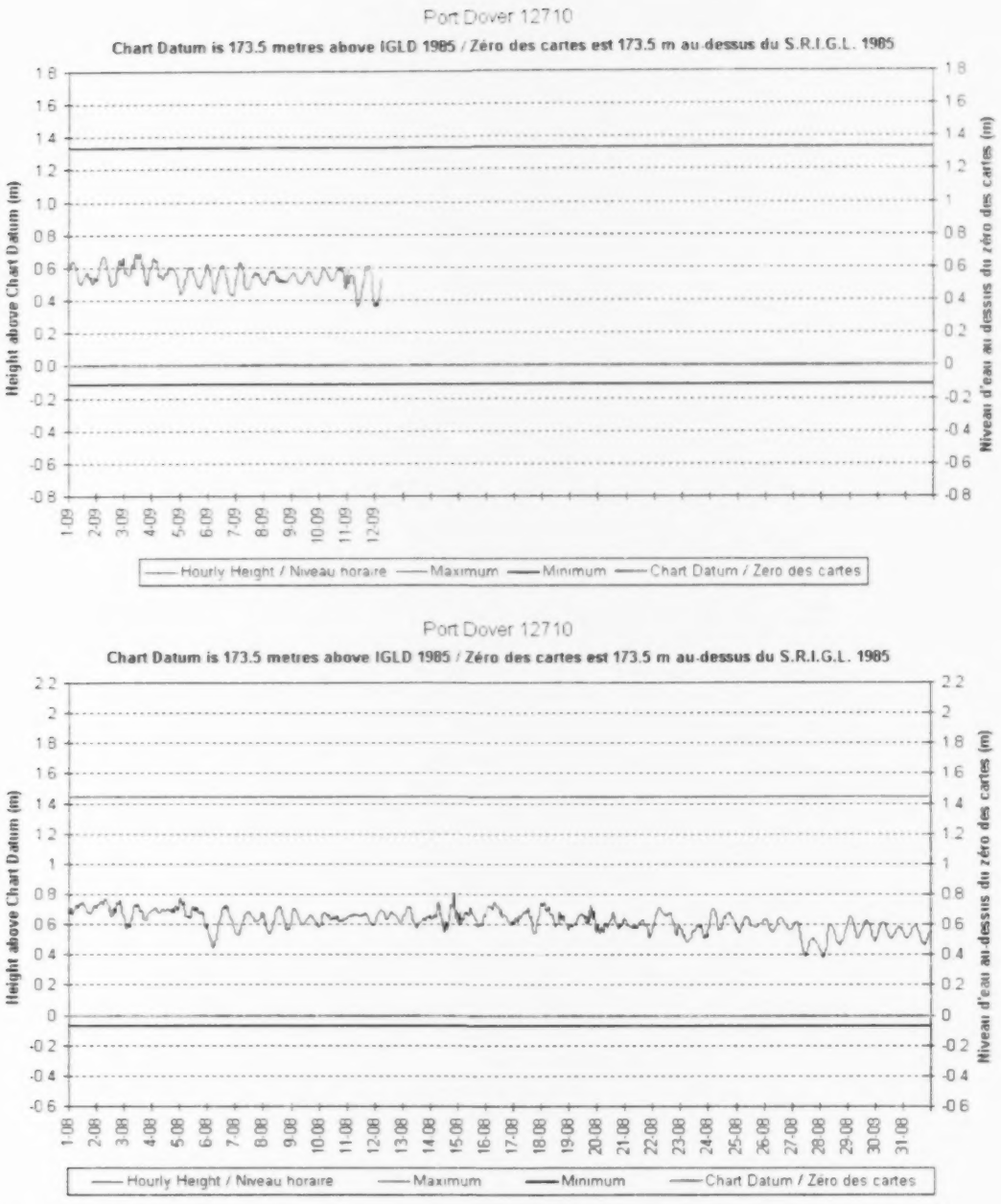
Port Dover 12710
Chart Datum is 173.5 metres above IGLD 1985 / Zéro des cartes est 173.5 m au-dessus du S.R.I.G.L. 1985
Height above Chart Datum (m)
Niveau d'eau au-dessus du zéro des cartes (m)
Hourly Height / Niveau horaire
Maximum
Minimum
Chart Datum / Zero des cartes
Port Dover 12710
Chart Datum is 173.5 metres above IGLD 1985 / Zéro des cartes est 173.5 m au-dessus du S.R.I.G.L. 1985
Height above Chart Datum (m)
Niveau d'eau au-dessus du zéro des cartes (m)
Hourly Height / Niveau horaire
Maximum
Minimum
Chart Datum / Zéro des cartes

Figure 5. Lake elevations observed at Port Dover, Lake Erie, August 1-September 12, 2002

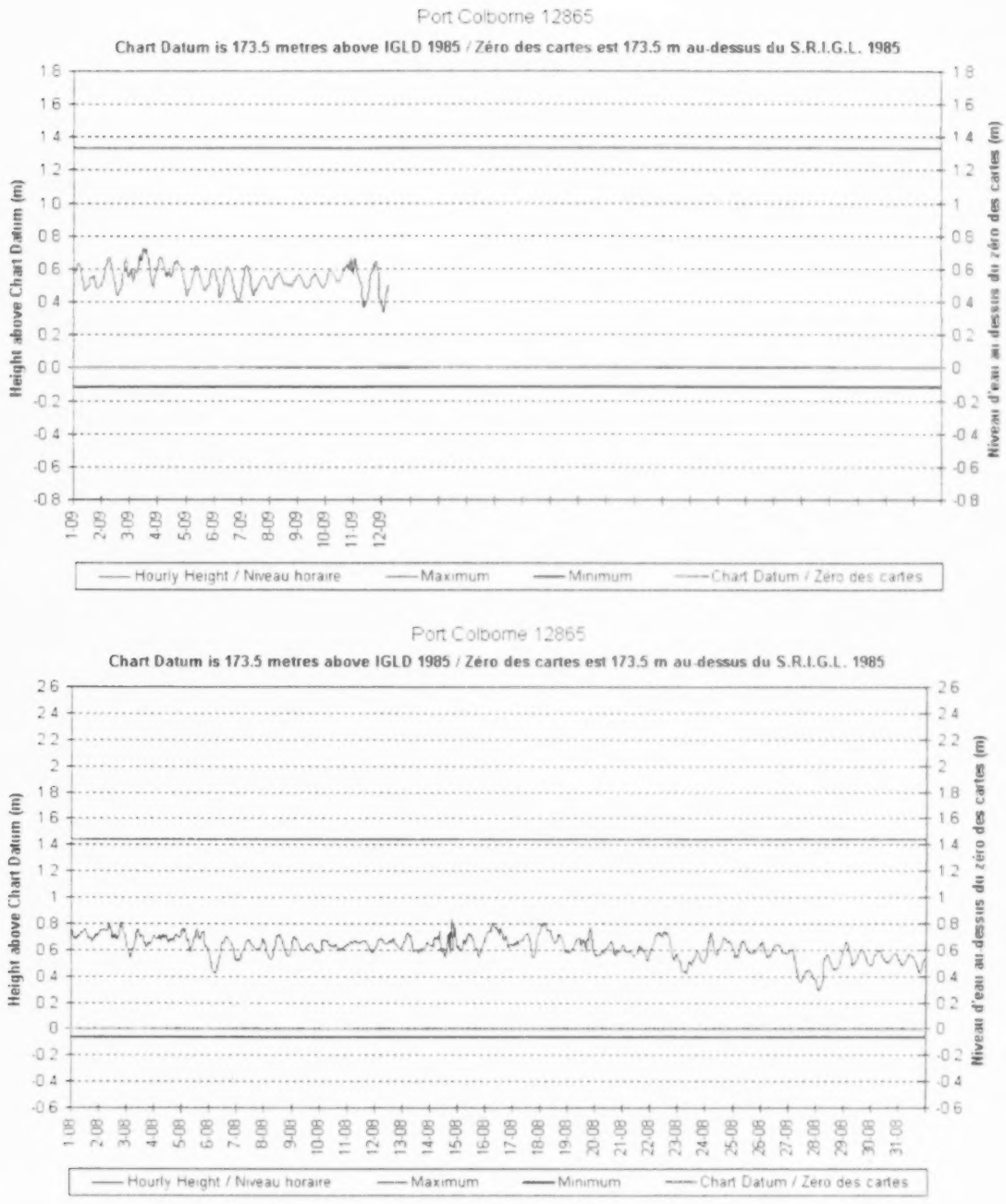
Port Colborne 12865
Chart Datum is 173.5 metres above IGLD 1985 / Zéro des cartes est 173.5 m au-dessus du S.R.I.G.L. 1985
Height above Chart Datum (m)
Niveau d'eau au dessus du zéro des cartes (m)
Hourly Height / Niveau horaire
Maximum
Minimum
Chart Datum / Zéro des cartes
Port Colborne 12865
Chart Datum is 173.5 metres above IGLD 1985 / Zéro des cartes est 173.5 m au-dessus du S.R.I.G.L. 1985
Height above Chart Datum (m)
Niveau d'eau au dessus du zéro des cartes (m)
Hourly Height / Niveau horaire
Maximum
Minimum
Chart Datum / Zéro des cartes

Figure 6. Lake elevations observed at Port Dover, Lake Erie, August 1-September 12, 2002.

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